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before the eggs are hatched than afterwards. During the time the female is laying her eggs, she does not fly directly to her nest, but alights near by on the branch of some tree or prominent object, and raises her head and tail together, and at the same time her crest; she reconnoitres the place for some minutes, and, scanning every object closely, then, if not alarmed, she enters her hole. The entrance to her nest is not round, but in the form of an ellipsis. It is larger, but otherwise similar in shape to that of the Sand-martin. It is astonishing that so great an observer of natural objects as Mr. Audubon should represent the entrance to the nest of the Martin as being round; such a mistake, not being in conformity with the facts in relation to the posture and appearance of the birds he so beautifully delineates, destroys the harmony of his whole picture. The Kingfishers arrive early and prepare their nesting-place; they then lay their eggs, and incubation commences about the tenth of April.

NOTES ON TROPICAL FRUITS.

BY W. T. BRIGHAM.

[Continued from page 311.]

Ananassa (various species),—Pineapple, Ananas. The flavor of tropical fruits raised under glass is almost always inferior, but the pineapple is a marked exception. Perhaps no fruit differs more in quality in its own native land, some fields producing a rich juicy fruit, while the plantations near by yield only a dry insipid produce. Under glass, the golden and ruby cones are almost always good. The best specimens of pines come, it is said, from Guayaquil; but the little island of Niihau, in the Hawaiian group, produces a fruit rich and melting, such as is seldom found in the East Indies. Here they may be eaten as oranges.

The manner of growth is sufficiently familiar. A cluster of stiff, pointed, serrated leaves, two or three feet long, from whose midst rises a stem of about equal height, bearing on its club-shaped extremity a tuft of small leaves, beneath which, on the expanded part of the stem, are the violet, mint-shaped flowers. As the flowers fall off, each one is succeeded by a slight protuberance, and these all swell together, grow juicy, and at last the cone of the perfected fruit remains. The fruit varies in shape from an almost globular to a very acute conical form; a species of the latter form is much cultivated in Peru, and has white flesh, although many prefer a small fruit of dark red color externally, and yellow within. As the pine bears no seeds, it is propagated by cuttings; the crown of leaves, when planted, requires nearly three years to come to maturity, while the offshoots from the base bear in a twelvemonth.

The fruit is eaten raw or cooked, and the juice makes an excellent wine, or may be fermented as beer. A ripe fruit is best eaten by breaking apart the little radiating cones of which it is composed, and sucking each one from the centre outwards. The fibre of the leaves is most beautiful and silky, and is used largely in making the piña cloth. A field of wild pines, such as cover many of the islands in the Straits of Malacca, is almost as rough and inaccessible as a field of cacti, and the sharp stiff leaves are formidable weapons to the bare legs of invaders; but the bright fruit, peeping out here and there all through the wilderness of spines, is quite sufficient to attract gatherers. At night, as the land-breezes sweep down over these islands, they take with them the exquisite fragrance to comfort the poor sailors who may have spent the day in scratching their bodies and tearing their clothes in getting pines.

As an ornamental plant, the pine presides with queenly state in the beautiful Botanical Gardens at Singapore, and its huge golden yellow fruit, often fifteen inches long and seven to ten in diameter, might well look down in contempt

on the wretched specimens of its race thrown upon our wharves.

Tacca pinnatifida,—Arrowroot, pia. Of the many plants which produce the starch known as arrowroot, the tacca is the most important in the Pacific Ocean. On the Hawaiian Islands it grows wild, and its tuberous roots are much sought after. The plant is low, conspicuous only from its deeply cleft horizontal leaves, above which rises in the proper season a cluster of greenish flowers. The tubers are shaped like potatoes, and so far as known are never eaten raw, being quite acrid, although by no means so poisonous as the manihot.

Musa (various species),—Banana, Plantain. The best and most important of all tropical fruits, found in the tropics of every continent, and universally cherished by the people whose meat it is. Every one would know a banana at sight, and yet the pictures of the plant, even in our best text-books, are very faulty. One of the common geographies represent it as bearing two bunches of fruit; another, as having a distinct stem.

When the cutting or shoot is planted (and it requires a deep rich earth and much moisture to grow in perfection), it soon sends up two leaves, tightly rolled together, until the green roll has grown some two or three feet, when the blades unroll and become most tempting food for cattle of all sorts. These leaves are followed by others until the stems of the leaves have formed a smooth trunk some eight or ten inches thick, and sheathed by the drying or dried remains of the earlier leaves. At the end of nine months a deep purple bud appears in the centre of the leaves, and its constantly lengthening stem pushes it out beyond the leafy envelopes, and it hangs down heavily like a huge heart. Now along the stem are seen little protuberances in rows, extending perhaps two-thirds of the way around the stem, and as the great purple envelopes of the bud fall off, these are seen to be

little fruits, each with a waxen blossom and huge projecting stigma at the end. These are the female flowers farthest from the end of the stem, while as successive purple leaves fall off (you may see the scars they leave on any bunch of bananas), the male flowers are seen in closer rows and of the same waxen yellow color. The flowers are full of a good honey. Three or four months are required to ripen the fruit, and in the mean time the bunch of male flowers has withered and dropped away, and the ovaries of the female blossoms have swollen into bananas, it may be a foot long, and the huge bunch hangs down scarcely supported by the now withering stem. The fruit is ripe, and the banana has done its work, and, if left alone, soon dries up and dies. From its base spring up shoots which may be transplanted. If the stem is cut down to the ground as soon as the fruit is gathered, the round bulbous rootstock sends up new leaves, and a second plant matures much sooner than do the offshoots.

Although most banana bunches hang down in maturity, a kind is found on the Society Islands, whence it has been introduced to the Hawaiian, whose very large bunches of deep orange-colored fruit stand up erect, forming ornamental rather than useful objects; for their taste, even when cooked, is exceedingly disagreeable and acrid. The Brazilian banana, so-called (and no attempt is made to give here the correct names, as the nomenclature is hopelessly confused in different countries, and the bold writer who should attempt to write a monograph of this genus, would need all his courage), is tall, rising to a height of fifteen, or even twenty feet, and the fruit is yellow and excellent, rather vinous in flavor; these are the long yellow bananas common in our markets. The Chinese banana seldom exceeds five feet in height, the leaves are of a silvery hue, and the fruit quite aromatic. The Fei, or Tahitian banana, is similar to the Brazilian but not so tall, and the fruit is angular, yellow, turning black when fully ripe, and the flesh is salmon-col-

ored or buff, and slightly acid. Then there are varieties with red fruit quite common here, blunt fruit, and some with a very diminutive fruit of fine flavor. The names Banana and Plantain are used almost indiscriminately, but the latter usually applies to those varieties which are coarser and usually eaten cooked.

Usually no seeds are found within the pulp, but at Akyab, and along the coast of Arracan, a kind is found full of seeds. These seeds are black, rough, about the size of cotton-seeds, and enveloped in a sort of fibre so that they cannot be readily cleaned. The taste of this variety is very inferior.

The Spaniards have a curious superstition about the fruit. The cross section presents a rude cross, and from this they suppose the banana was the forbidden fruit, and Adam saw, in eating it, the mystery of redemption by the cross. The cross is not very distinct, and the excellent Padre Labat remarks, after mentioning this belief: "There is nothing impossible in this; Adam may have had better eyesight than we, or the cross was better shaped in the bananas which grew in his garden."

The ways of eating bananas are almost innumerable. Raw, they are eaten by themselves, or cut in slices with sugar and cream, or wine and orange juice. Cooked when green or ripe, they are fried alone or in batter, baked with the skin on, made into a pudding much resembling an apple dumpling, or baked in pies. They may be cut in strips and dried, or pounded into a paste and dried; in the latter form they are the staple food of many Mexican tribes. The amount of nourishment is very great, and Humboldt's statement is often quoted, that the same extent of land which produces one thousand pounds of potatoes, bears forty-four thousand pounds of bananas; a surface bearing wheat enough to feed one man, will, when planted with bananas, feed twenty-five. Lucky the people who can eat bananas, and leave the potatoes for the hogs!

The young shoots are cooked as greens, but the stem and

old leaves are full of a watery acrid juice, which stains white cloth an indelible black or dark brown. The fibres of the leaves make a textile fabric of great beauty, known as a fine kind of grass cloth.

In cultivation the plants are set closely, the Chinese banana requiring only three or four feet between the rows, and the clusters are gathered before they are quite ripe, and hung up in some cool place, or better still, buried in the earth. Some bananas are certainly improved by this premature gathering, but others are much better when ripened in the natural way. The prices on the Isthmus of Panama, and at most tropical ports, varies from a real ($12\frac{1}{2}$ cts.) to a dollar, according to the size of a bunch and the season of the year. The prices asked in the Boston market are simply outrageous, and our fruit-dealers let the fruit rot in their windows rather than lower the price.

A plantation will yield all the year round by timing the planting, but the crop is much more abundant at one season. The care the plants require is little enough if they are planted by a brook or in moist ground, and the bunches of fruit may weigh eighty, or even more than a hundred pounds when ripe.

The geographical limits of the banana are much more extensive than those of the cocoanut, and extend even beyond the tropics.



DIRECTIONS FOR COLLECTING LAND AND FRESH-WATER SHELLS.

BY JAMES LEWIS, M. D.



If the collector is provided with suitable apparatus for gathering certain classes of shells, his work is more than half done when he has *found* them. This is especially true of land shells. The apparatus needed for these is simply